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(19) (CA) **CANADIAN PATENT** (12)

(54) Anti-Counterfeit Program Ticket and System Therefor

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ABSTRACT OF THE DISCLOSURE

Apparatus for detecting counterfeit performance tickets is disclosed. A performance ticket has machine readable coded information in a visible form relating to the performance nature, date and time and in an invisible form encoding additional information unique to the performance. The apparatus comprises a device for receiving the ticket and machine reading the first and second codes of the ticket. The device has a programmable memory which stores the correct information of the first and second codes. The machine read information is compared to the stored information. In the event of a match, a stub portion is removed from the ticket and returned to the patron. In the event of a non-match, an alarm is actuated to indicate either a faulty ticket or a counterfeit ticket. A process for printing the invisible code is disclosed.

FIELD OF THE INVENTION

This invention relates to performance tickets and the manner in which they are printed for use in apparatus which is capable of validating the performance tickets.

BACKGROUND OF THE INVENTION

Due to significant advances in photocopying and other printing techniques, it is possible to make in an unauthorized manner a ticket which is at least visually identical to the original. These counterfeit tickets can be sold by counterfeiters at performances which has resulted in substantial losses by the operators of the performances.

In the field of counterfeit detection, numerous techniques have been developed to prevent counterfeiting of credit cards and equipment has been developed for detecting counterfeit credit cards. Examples of transaction cards having visible and invisible encoded information are disclosed in United States patents 3,601,913, 3,683,413, 4,066,873 and 4,092,526. The latter patent discloses visually readable numbers imprinted into the plastic card and also a band of magnetically encoded information. Various processes are used in applying the magnetically encoded information to the card in a manner which is difficult for the counterfeiter to detect and, therefore, difficult to reproduce on a counterfeit card. For example in United States patent 4,092,526, radiant energy reflectors are used in conjunction with the magnetizable strip containing magnetically recorded data, where the reflectors are only visible under infrared radiation. This arrangement necessitates expensive equipment to detect the encoded information and to reproduce a card having the encoded information.

None of the above approaches, however, have been used in the field of performance tickets to prevent counterfeiting thereof. The performance ticket apparatus for reading information from the ticket and the process of printing the ticket, according to this

invention provides a system which from a cost standpoint minimizes or eliminates the counterfeiting of performance tickets. In the credit card business, where the potential unauthorized use of a credit card may be in the thousands of dollars, the use of more sophisticated equipment in attempting to break a code on a credit card is warranted, whereas a performance ticket has a limited value and thereby determines the sophistication of equipment which could be used in counterfeiting the ticket.

SUMMARY OF THE INVENTION

A performance ticket, according to an aspect of the invention, has visible information printed thereon which indicates data such as the nature of the performance, the date of the performance and the time of the performance. The ticket has a stub portion which is severable from the ticket. The ticket has on an area apart from the stub portion a first machine readable code which is visible to the patron, and a second machine readable code which is invisible to the patron. The visible and invisible machine readable codes are oriented in the same direction. The visible machine readable code encodes at least portions of the information which is consistent from ticket to ticket for a particular performance and the invisible machine readable code encodes additonal information unique to the performance.

The apparatus, according to an aspect of this invention for reading the performance ticket, comprises means for receiving the performance ticket, means for machine reading the first and second codes on the ticket and means for aligning the first and second machine readable codes with the code reader means. Transport means is provided for effecting relative movement between the ticket and the code reader means for machine reading the codes. Programmable memory means stores the information of the first and second codes. Means compares the machine read codes to the stored codes in the memory means. Means indicates a valid ticket by

determining a match or an invalid ticket by determining a non-match of the machine read and stored codes and means removes a stub portion from the ticket in response to the comparator means determining a valid ticket and returns the stub to the patron.

According to an aspect of the invention, the performance ticket is printed by selecting a ticket media which has a surface of high reflectivity suitable for use with visible machine readable code format. Information is printed on the ticket which is readable by the patron and defines data such as the performance nature, date, time and seating. A first machine readable code is printed on a ticket which encodes at least the information which is consistent for tickets of a particular performance and is visible to the patron. A second machine readable code is printed in the same direction as the first code with visible magnetic ink and which encodes additional information unique to the performance. The second code is masked with a non-magnetic ink to provide a color patch on the ticket thereby rendering the second code invisible to the patron.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention are shown in the drawings wherein:

Figure 1 is a perspective view of a performance ticket printed in accordance with this invention;

Figure 1a is a perspective view of the rear portion of the ticket of Figure 1 having machine readable information encoded thereon;

Figure 2 schematically illustrates the apparatus according to this invention for reading the ticket of Figure 1;

Figure 3 exemplifies the information which may be encoded in a visible machine readable code;

Figure 3a exemplifies an alternate approach for encoding information in the visible machine readable code;

Figure 4 is block diagram showing the apparatus for printing the tickets;

Figure 5 shows an upper section of the ticket with machine readable codes printed thereon;

Figure 6 is a perspective view of portions of the apparatus of Figure 2 which manipulate and read the performance ticket;

Figure 7 is a block diagram showing the components of the apparatus of Figure 2; and

Figures 8a and 8b are logic diagrams for the computerized control of the apparatus of Figure 2;

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A standard type of performance ticket is shown in Figure 1. The performance ticket 10 has a ticket portion 12 and a stub portion 14 as defined by line 16, which may be perforations or a dotted line. The ticket portion 12 has printed thereon standard information 18 which is visually readable by the patron and includes data such as performance nature, date, time, price and seating. Similarly, on the stub 14 is visually readable information 20 setting out relevant portions of the information concerning the performance.

According to this invention, additional machine readable information is printed on the rear face of the ticket, as shown in Figure 1a, to thwart counterfeiting and, by the apparatus of this invention, determine counterfeit tickets. Printed on the ticket rear face 13 are machine readable codes 24 and 26. The machine readable code 24 encodes the information 18. As shown in Figure 3a, code 24 encodes the year, month and day, performance and the section, row and seat. At the beginning and end of each code 24 are the standard start, check sum and stop codes which control the machine reading of the codes. According to a preferred embodiment of the invention, the code 24 is adapted to encode alphanumeric characters in the standard density "Code 39" in accordance with the Material Handling Institute Incorproated format. It is appreciated, however, that code 24 may be printed in other machine

readable formats, such as optical character recognition characters and magnetic ink characters. It is also appreciated that for simpler, economic applications, the encoded information may be an eight digit number as shown in Figure 3. The information 18 may be encoded by a plurality of numbers to facilitate the printing and reading of the code.

An additional code 26 is provided on the ticket portion 12, which appears as a color patch, where the machine readable code therein is invisible to the patron. The additional information encoded by code 26 is unique to the performance or other circumstance related to the performance, such as the performance operator identification or the day for all performances thereon. Various techniques according to this invention can be used for masking a machine readable code. According to a preferred embodiment of this invention, the machine readable code is printed on the ticket rear face 13 in magnetic ink. The coded information in magnetic ink is covered with a non-magnetic ink of the same color as the magnetic ink to provide the color patch 30. It is appreciated that other ink colors may be used as long as the non-magnetic ink color used is opaque and covers the magnetic ink to render it invisible to the patron. Thus the patron on inspecting the ticket would have no idea as to the purpose of the color patch 30 and for the counterfeiter, sophisticated equipment is required to determine what the code 26 may be. In view of the normal price of performance tickets, the costs of such sophisticated equipment for breaking the code of the performance ticket would far outweight any expected gains from selling a limited number of counterfeit tickets for any particular performance.

Figure 2 shows schematically the equipment which is used to accept tickets of the type of Figure 1, determine if they are valid tickets and permit entry of the patron. A ticket taker unit 32 is located near a turnstile 34 which is normally locked and prevents patrons from passing therethrough. It is appreciated

that gating would be provided about the turnstile 34 so as to control passage through the turnstile. The ticket taker unit 32 is located in advance of the turnstile, where the patron inserts ticket 10 into the ticket taker unit through slot 36. The ticket taker unit 32 has devices for reading the codes 24 and 26 on the rear of the ticket. The ticket taker unit 32 has provided therein or has access to a programmable memory in which the encoded information of code 24 and code 26 are programmed into the programmable memory. The ticket taker unit reads the codes 24 and 26 and upon matching of the read information of codes 24 and 26 with the stored information, the match indicates that the ticket is for the correct performance and has the correct invisible machine readable code. The ticket taker unit then severs the stub portion 14 from the ticket and returns it to the patron and releases the turnstile 34 to allow the turnstile bars 38 to rotate and allow the patron to pass. Optionally the encoded information of code 24 may be read and transferred to an offline computer for performance analysis purposes.

Various forms of visual devices and audible devices may be used to indicate the status of the ticket inserted into the ticket taker unit. On the unit 32, there is a green light 40 and a yellow light 42. A display panel 44 is located remote of the ticket taker unit 32 and is in communication therewith via cable 46. The display unit has a green light 48, a yellow light 50 and a red light 52. In the event that the ticket taker unit 32 determines a valid ticket, a signal is sent via cable 37 to release the lock mechanism in turnstile 34 to allow the bar portion 38 to rotate. A second signal is sent via cable 46 to actuate green light 48. In the event that the ticket taker unit is unable to read one or more of codes 24 and 26 due to that portion of the ticket being damaged, then the yellow lights 42 and 50 flash on the ticket taker unit 32 and on the remote display panel 44. This alerts the operator of the particular ticket taker unit, to proceed to the

turnstile and check out the ticket and determine whether or not the patron should pass.

In the event that the code reader of the ticket taker unit cannot locate on the ticket a magnetic code, then this indicates a counterfeit ticket. Such determination sounds an audible alarm 54 on the unit and actuates a flashing red light 52 of the remote display panel 44. This alerts the security people to a counterfeit ticket at the turnstiles. Optionally, such determination can activate remote cameras to take photographs of people in the area where the counterfeit ticket has been inserted. This may assist the operators in apprehending the person who has inserted the counterfeit ticket and in turn, track down the source of the counterfeit ticket.

The information encoded in the invisible code 26 is normally changed for each performance, so that the code is in one way or another unique to the performance. Thus before each performance, or before the performances for a particular day, the ticket taker unit 32 has its programmable memory altered to store the correct data corresponding to the information encoded on the invisible portion of the performance ticket. According to a preferred embodiment of the invention, a handheld master programmer unit 56 is connected by interface cable 58 to the ticket taker unit 32 at junction 57. The handheld programmer unit 56 has a keyboard 60 with visual display 62. The particular code 26 for the performance or performances of a particular day, which will be found on all tickets for the corresponding performance or performances, is entered into the programmable memory of the ticket taker unit 32 by way of the keyboard 60. The information encoded in the invisible code 26 may be alphanumeric or simply numeric of two of more characters which has perhaps a unique performance operator code or performance/game code. The particular code 24 for each performance is also entered into the programmable memory. The information stored is usually the performance identification, the day and the

time. Although it would be impractical to enter all information on seating, it may be desirable to enter into the memory of the unit 32 a range for the appropriate seating for a particular performance and thereby control seating in this manner. Visual readout on monitor 62 indicates the codes entered to allow the user to ensure that the proper codes have been entered into the memory of ticket taker unit 32. Upon vertification of correct data loading by a double check, the interfaced cable is removed to permit programming of the next ticket taker unit with the handheld programmer 56.

The ticket taker unit 32 may be connected via interface cable 63 to an offline computer 64. This may be a permanent hook up to the offline computer where, instead of the handheld programming unit 56, the memory for the ticket taker unit can be programmed by the offline computer to enter on a day-to-day, performance-to-performance basis the data encoded by the by visible code 24 and invisible code 26 on the program ticket. In addition, the information read from the code 24 may be transmitted via dataline 62 to the memory of offline computer 64. This allows the larger offline computer memory to store data concerning the attendance at the performance by way of noting the types of information of code 24 as shown in Figure 3a. Depending upon the degree of sophistication in the system, it may also be possible to compare the code concerning section, row and seat in the information of code 24 to the information stored in the offline computer 64, so that if a ticket has already been passed with the same section, row and seat, this provides a further indication that the ticket may be counterfeit.

Turning to Figure 4, a sheet of paper stock 66 is fed beneath a printer 68. Printer 68 prints the visually readable information 18 and 20 on each ticket 10 of Figure 1. To economize on the printing operation, the printer 68 prints six tickets across the width of the paper stock as indicated at 70, after the ticket

sheet has [redacted]ged from the bar code reader 7[redacted] The printer 68 is controlled by print controller 74 via cable 76. The information to be printed on each ticket including the specific section, row and seat is determined by controller 74. Via interface cable 78, information is input to the controller for the bar code printer 80 regarding the information to be encoded in codes 24 and 26. The controller 82 controls the bar code printer 80 via cable 84. The bar code printer has the facility to print in one pass on six adjacent tickets each of the codes 24 and 26. The printer 80 also includes the facility to mask the code 26 with a non-magnetic ink to provide the color patch 30. The series of adjacent tickets then pass through the bar code reader 72, where the codes 24 and 26 on each freshly printed ticket are read. The read information is input via cable 86 to the controller 82 for comparison to the information which was instructed to be printed, and providing the information read is correct, the tickets are passed on for scoring along lines 88 so that the tickets may be severed from the web 66.

The paper stock used will be a high quality paper with sufficient heat resistance to retain its integrity following the printing operation of the bar code by a laser printer which provides the needed capabilities for printing information as in Figure 3a. The information of Figure 3 may be printed with standard mechanical or lithography techniques. Similarly with the magnetic bar code, it may also be printed by conventional lithography or similar techniques. Additional considerations in selecting the paper are surface reflectivity, radiation pattern, transparency, paper bleed and durability which properties are well known by those skilled in this art.

In printing the bar code, it is appreciated that several considerations are also required, as will be understood by those skiled in the art, such as ink voids and specs, ink spread and shrink, ink smearing, ink non-uniformity, bar/space width tolerances, and edge

roughness of each printed bar. An additional critical parameter to be considered in the printing operation is the print contrast signal which is a function of reflectivity of the media and the reflectivity of the ink. A print contrast signal of greater than 65% is required for reliable machine reading.

Similar considerations are required in printing the magnetic bar code which may be of the standard density "Code 39" insofar as concerning ink voids and specks, ink spread and shrink, ink smearing, ink non-uniformity, bar/space width tolerances and edge roughness.

As shown in Figure 5, the upper portion of ticket rear face 13 has the visible bar code 24 and the visible portion of the magnetic bar code 26. All of the codes printed are oriented in the same direction so that they will all be read in directions which may be the same or parallel to one another and read in the same or opposite directions. In order to mask the code 26 to render it invisible to the patron, the area 90 is covered with a non-magnetic ink optionally of the same color as the magnetic ink used to print code 26. This provides a color patch 30, as shown in Figure 1, which thereby camouflages the magnetic code 26. It is appreciated that the code 26 may also be printed in other characters such as numeric and alphabetic characters commonly used on printed cheques and the like.

Turning to Figure 6, components within the ticket taker unit 32 are shown. The ticket 10, after insertion through the slot 36 of the reading unit, is moved along between guide rails 92 and 94 by opposing feed rollers 96 and 98. Sensors (not shown) are positioned in front of the feed rollers 96 and 98 to actuate them upon sensing the insertion of a ticket through the slot 36 to feed the ticket along the guide rails 92 and 94. The ticket 10 continues to be fed in the direction of arrow 100 until it meets platform 102 with stop 104. Stop 104 includes a sensor to indicate

that the upper edge 106 of the ticket, as shown in Figure 5, abuts the stop portion 104 to halt feeding of the ticket by positive drive rollers 96, 98. Upon sensing the upper edge 106 of the ticket, an electrical solenoid 108 is actuated to clamp the ticket on platform 102 by clamp plate 110 moving in the direction of arrow 112. The ticket is now secured above the devices 114 for reading the machine readable code on the rear face 13 of the ticket. The reading device 114 includes a reading sensor or wand 116 for reading the magnetically encoded information in code 26. A second sensor or wand 118 is provided for optically reading the visible machine readable code 24. The sensors are mounted on a transport 120 which has depending arms 122 which slidably engage a support 124. A link arm 126 interconnects the transport 120 to drive wheel 128. Rotation of the drive wheel in the direction of arrow 130 causes reciprocation of the transport 120 in the direction of arrow 132.

After the ticket is clamped, the drive wheel 128 is actuated to transport the sensors 116 and 118 across the machine readable codes 24 and 26. Depending upon the type of decoder used, it is possible to use a single decoder with both sensor heads 116 and 118. The magnetic sensor head 116 can read the code 26 as the sensor head is moved in a first direction along the codes. With appropriate spacing between the optical head and magnetic head and sufficient travel of the transport mechanism 120, the optical reader head 118 can read the optical code 24 on its return pass over the encoded information. Thus with one rotation of the wheel 128, both codes can be read to expedite the reading process.

Upon validating the ticket, the knife 134 is actuated to sever the stub portion 14 from the ticket. The stub portion 14, as shown in dot at 14a, falls in the direction of arrow 136 down the trough portion 138 for presentation to the patron. A sensor may be provided to determine when the patron has removed the

stub so [redacted] to release the turnstile bars [redacted] The patron with the ticket stub in hand, is then permitted to pass the turnstile. The turnstile includes a latching arrangement which locks up the bars as soon as the patron has passed therethrough, so that the next patron in line must have his ticket validated before passing through the turnstile 34.

It should be noted that the guide rails 92 and 94 serve to align the machine readable codes on the underside of the ticket with the reading mechanism 114 to ensure a proper read. As the reading heads 116 and 118 are passed over the codes, the reading heads send impulses representative of the information read from the codes via the cables 115 and 116 to a memory bank. The wheel 128 is driven at a speed, as will be understood by those skilled in the art, to ensure that the wands are moved in a manner to permit reading of the information. The suggested range within which the wands may be moved may vary from five to forty centimeters per second. The wands may be moved either at a constant velocity or at a varying speed. The machine reading wand 118 may be of the standard type which is commonly used in the reading of visual bar codes, such as the high resolution digital bar code wand HEDS-3203 (trademark) manufactured by Hewlett Packard. The code reading sensor 116 is of the type commonly used for sensing magnetic bar codes which use sensing elements, such as cassette tape recorder read/write heads, Hall effect sensors or other similar devices; for example the type used to read the magnetic characters on printed cheques. The transport mechanism is designed to always return to its zero position and remain in a stand-by mode awaiting further instructions from the control program. Should the controller determine that another scan on the same ticket is required, the transport mechanism 114 will be actuated again and upon completing the scan will be retracted to the home position. After validation of the ticket, the clamp 110 is released and the portion 12 of the ticket

having the machine readable code is removed by rollers 96, 98 and deposited within the ticket taker unit.

Turning to Figure 7, a block diagram of the components in the ticket taker unit 32 shows the use of a single chip programmable microcomputer 140 to control the operation of the code reading devices, the drives therefor, the cutter, turnstile status indicator and alarms. The unit is powered by power supply 142 which by arrow 144 indicates that the various units requiring power are connected thereto. The microcomputer 140 has interconnected thereto by data interfaces a read only memory 146 and random access memory 148. The read only memory 146 contains the program for the microcomputer 140 in selecting the various sequences in validating a ticket, cutting the stub portion therefrom and releasing the turnstile; or in the event of an invalid ticket, sounding the appropriate alarms. In addition, further programming information may be provided in the read only memory to control transmission and receipt of data through the interface circuits 150 which process and transmit information to and from a master processing unit or a large mainframe computer via cable 151.

The random access memory 148 stores the information which is coded in codes 24 and 26. It also stores the information which is read by the machine reader 100 and by way of a comparison routine directed by the program for the microcomputer 140, the read information is compared to the stored information in the process of validating the ticket in a manner to be discussed with respect to the logic diagrams of Figure 8.

The optical reader (118) is connected via cable 115 to the decoder circuit 152 which in turn is connected to the microcomputer by cable 154. The decoder circuits act as a data interpreter or translator of the serial time data read by the moving wands. The decoder converts this serial data into binary code data which is then formated into a specific communication protocol for transmission to the microcomputer 140 and

momentarily stored in RAM 148. The magnetic reader 116 transmits data via a transmission line to the decoder 152. Assuming that the same code format is used for the visible and invisible codes, the decoder circuits 152 can be adapted to decode both sets of signals arriving from transmission lines 115 and 117 and package them for transmission to the microcomputer 140. The microcomputer is connected to the sensor on stop 104 to actuate the stepper motor drive 156 which controls movement of the stepper motor 158 via transmission line 161. The stepper motor 158 in turn drives the transport device 114. Simultaneously, signals are transmitted to the optical and magnetic readers to ready them for reading the machine readable codes, as the stepper motor 158 moves the transport device 114 across the upper surface of the codes.

Upon the microcomputer validating the ticket, a signal is sent via cable 160 to the cutter driver 162 to actuate the the cutter motor 164 via line 163 in slicing the stub portion 14 from the ticket. According to the next step in the program of the read only memory, the turnstile relay driver 166 is actuated to withdraw the turnstile relay 168 via line 37 which unlatches the turnstile bars.

An additional component is the status indicator driver 170 which is actuated by the microcomputer. The driver drives the green light 48 of the display panel 44 via line 167 to the relay and line 46 to the light.

In the event of a ticket which cannot be properly read, the program in the read only memory directs the microcomputer to actuate the status indicator driver 170 to illuminate amber light 50 indicating presumably a damaged ticket or the like which will not permit a complete reading of the information on the ticket. On the other hand, in the event of an invalid ticket, the read only memory directs the microcomputer to actuate the alarm and indicator driver 174 to illuminate red light 52 on the display panel. At the same time, it actuates the sonic alarm 176. As

previously [redacted]tioned, there may be in additi[redacted]a remote camera which can be actuated by the signal in line 172 to commence photographing in the area about the turnstile which has discovered the invalid or counterfeit performance ticket.

To assist in understanding the logic sequence for the microcomputer in directing the various components, the logic diagrams of Figures 8a and 8b provide the sequence of the program in the read only memory 146. In the ticket taker unit, the presence of a ticket at 178 is determined by actuating the sensor on stop 96 and the indicators are cleared and clamping of the ticket is actuated in accordance with instruction 180. An additional instruction is provided at 182 to read the bar codes 24 and 26 by actuating the stepper motor 158 and queried at 184 if the read was successful. If the read is successful, the comparator of the microcomputer, in accordance with the program, compares the read data to the stored data to determine if the data is correct at sequence step 186. If the data is correct, the microcomputer determines if there is an offline computer present at step 188. If so, the valid data is transferred via the interface in accordance with step 190. If no offline computer is present, the sequence moves to the next instruction at 192 to activate the pass indicator 46 and release the turnstile relay 168. The remaining instruction at 194 is to cut the ticket stub and release the ticket. In this routine at decision 184 if the read is not successful, the program routine advances to determine at decision 196 if an offline computer is present and if so, in accordance with instruction 198, the invalid data is transferred. The next instruction at 200 is to activate the fail indicator driver 174 to sound the sonic alarm and display the indicator 176 and in turn in accordance with instruction 202, release the ticket.

As previously explained, the invisible code may be provided by way of magnetic ink which is masked with a non-magntic ink of the same color. The magnetic ink

may include gama Fe_2O_3 particles which are dispersed in a suitable organic binder for printing on the tickets. A conventional magnetic read head may be used with suitable electronic circuitry in reading the magnetized information at high speeds to detect the coded indicia on the ticket. The information of the invisible code may be of the numeric or alphnumeric type which is unique to the customer and/or the performance being held. For example, for each performance there may be a special code which is only applicable to that particular performance. Thus the invisible code along with visible code will be changed from performance to performance. The manual programming unit loads the RAM 148 with the particulars of the coded information in machine readable codes 24 and 26. The information is loaded into the RAM 148 in accordance with the program in ROM 146 so that the comparator sequence for the microcomputer 140 compares the coded information read by the optical and magnetic readers sequentially to the corresponding stored information in determining if the ticket is valid. In situations where the invisible code is changed from performance to performance, then after each performance the handheld programming unit 56 is connected to each ticket taker unit to reprogram its random access memory so that it is loaded with the correct information for the next performance.

It is appreciated that if a mainframe computer is present, it may be used to program the microcomputer RAM 148 without requiring the use of the manual handheld programming unit 56.

According to this invention, there is provided a specially printed performance ticket and system for reading the ticket to detect counterfeit tickets. This is accomplished by using a hidden or invisible code on the ticket which will be unique to the specific customer or event. The invisible code used is of a type which is difficult to reproduce and would require elaborate and expensive equipment to reproduce, which acts as a deterrent to counterfeiting in view of the low price of

each ticket. The visible code may be printed in a dense format to exacting specifications, thus making it difficult by photocopying methods to duplicate this portion of the ticket as the deterioration in quality inherent in the photocopying process may render the code unreadable.

The ticket taker unit may be set up so that within 1.5 seconds after insertion of the ticket, the unit has successfully read both codes on the first attempt. If the unit cannot successfully read the code, it will terminate reading attempts five seconds following ticket insertion and declare either the ticket as being counterfeit or damaged for inability to read.

Although various preferred embodiments of the invention have been described herein in detail, it will be understood by those skilled in the art that variations may be made thereto without departing from the spirit of the invention or the scope of the appended claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A performance ticket having visible information printed thereon which indicates data such as the nature of the performance, the date of the performance, the time of the performance and the seating section, said ticket having a stub portion which is severable from said ticket, said ticket having on an area apart from said stub portion a first machine readable code which is visible to the patron and a second machine readable code which is invisible to the patron, said visible and invisible machine readable codes being oriented in the same direction, said visible machine readable code encoding at least portions of said information which are consistent for each ticket of the performance and said invisible machine readable code encoding additional information unique to the performance.

2. A performance ticket of claim 1, wherein said second machine readable code is printed on said ticket and masked with an overlying opaque covering.

3. A performance ticket of claim 2, wherein said second machine readable code is printed on said ticket in magnetic ink characters and covered with a non-magnetic ink of the same color to form a color patch on said ticket.

4. A performance ticket of claim 1, 2 or 3, wherein said first and second machine readable codes are in bar code format.

5. Apparatus for machine reading a performance ticket having machine readable information printed thereon, said machine readable information being in the form of a first machine readable code which is visible to the patron where the encoded information relates to data which is the same for each ticket of a performance

such as th[redacted]erformance nature, date and ti[redacted] and a second machine readable code which is invisible to the patron and encodes additional data unique to the performance, said apparatus comprising means for receiving a performance ticket, means for machine reading said first and second codes on the ticket, means for aligning said first and second machine readable codes with said code reader means, transport means for effecting relative movement between said ticket and said code reader means for machine reading said first and second codes, programmable memory means for storing the information of said first and second codes, means for comparing the machine read codes to the stored codes in said memory means, means for indicating a valid ticket by determining a match or an invalid ticket by determining a non-match of the machine read and stored codes and means for removing a stub portion from the ticket in response to said comparing means determining a valid ticket and returning the stub to the patron.

6. An apparatus of claim 5, further comprising means for controlling a normally locked turnstile through which a patron must pass to gain entry to the performance, said turnstile control means releasing said turnstile in response to said comparing means determining a valid ticket.

7. An apparatus of claim 5, wherein said indicator means comprises visual and audible alarms which are selectively actuated in response to said comparing means determining an invalid ticket.

8. An apparatus of claim 5, wherein said first code printed on said ticket encodes the performance nature, date and time.

9. An apparatus of claim 7, wherein said comparing means distinguishes a first circumstance of machine read visible code portion which does not match said stored

code from a second circumstance of machine read invisible code which does not match said stored code or said code reader means fails to detect an invisible code, said indicator means actuating a visible signal in response to said comparing means distinguishing said first circumstance and said indicator means actuating an audible alarm in response to said comparing means distinguishing said second circumstance.

10. An apparatus of claim 9, wherein means for photographing the area about said apparatus is actuated in response to said comparing means distinguishing said second circumstance.

11. An apparatus of claim 5, wherein information relating to the seating particulars is encoded in said first machine readable code, said code reader means reading said encoded seat information.

12. An apparatus of claim 5, further comprising a handheld portable master programming unit which is connectible via an interface cable to said memory means, said programming device having a keyboard which permits the user to input the data of said first and second code into said memory means.

13. An apparatus of claim 5, wherein said first and second codes are in bar code format, said first code being a visible printed bar code and said second code being a visible bar code printed with magnetic ink, said second code being masked with a non-magnetic ink to provide a color patch on said ticket, said code reader means comprising a visible bar code reading device and a magnetic ink bar code reading device appropriately positioned to permit reading of said invisible and visible codes on said ticket when said reading devices are transported over the ticket.

14. An apparatus of claim 11, further comprising computational means continuously connected via an interface cable to said memory means during use of the apparatus, said memory means being programmable by said computational means to enter data corresponding to said first and second codes, means for transmitting to said computational means the machine read first and second codes in response to said comparing means detecting a match, said computational means having a back up memory for storing all machine read information including seating information and said computational means comparing machine read seat information to stored seat information, said computational means determining an invalid ticket upon detecting a match of the machine read and previously machine read seating information.

15. An apparatus of claim 5, wherein said ticket alignment means includes means for clamping said ticket when in register with said code reader means, said transport means moving said code reader means along said ticket to machine read at least said second code.

16. A process of printing a performance ticket comprising selecting a ticket media which has a surface of high reflectivity suitable for use with visible machine readable code format, printing on said ticket information which is readable by a patron and which defines the performance nature, date, time and seating, printing a first machine readable code which encodes at least portions of said information which is the same for each ticket of the performance and which is visible to the patron, printing with visible magnetic ink in the same direction as the first code a second machine readable code which encodes information unique to the performance and unrelated to the information encoded in said first code, masking said second code with a non-magnetic ink to provide a color patch on said ticket and thereby rendering said second code invisible to the patron.

17. A process of claim 16, wherein a stub portion is printed on said ticket which is spaced from said first and second codes.

18. A process of claim 16, wherein said non-magnetic ink is of the same color as said magnetic ink.

FIG.1.

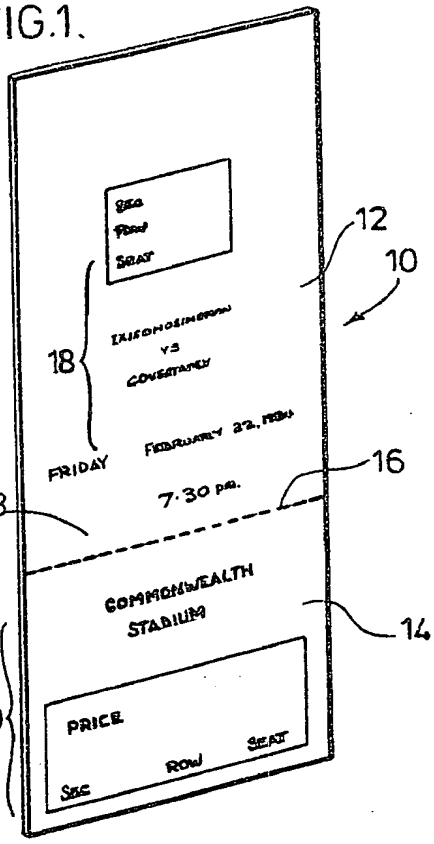
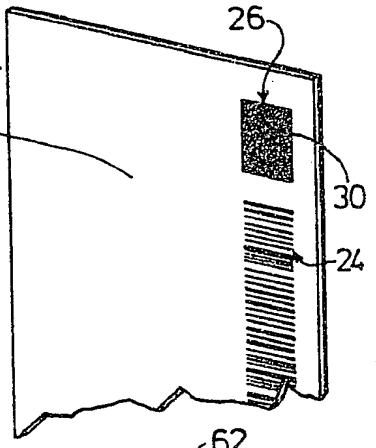


FIG.1a.



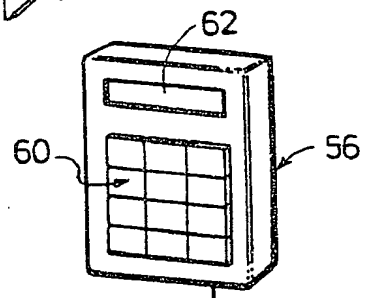
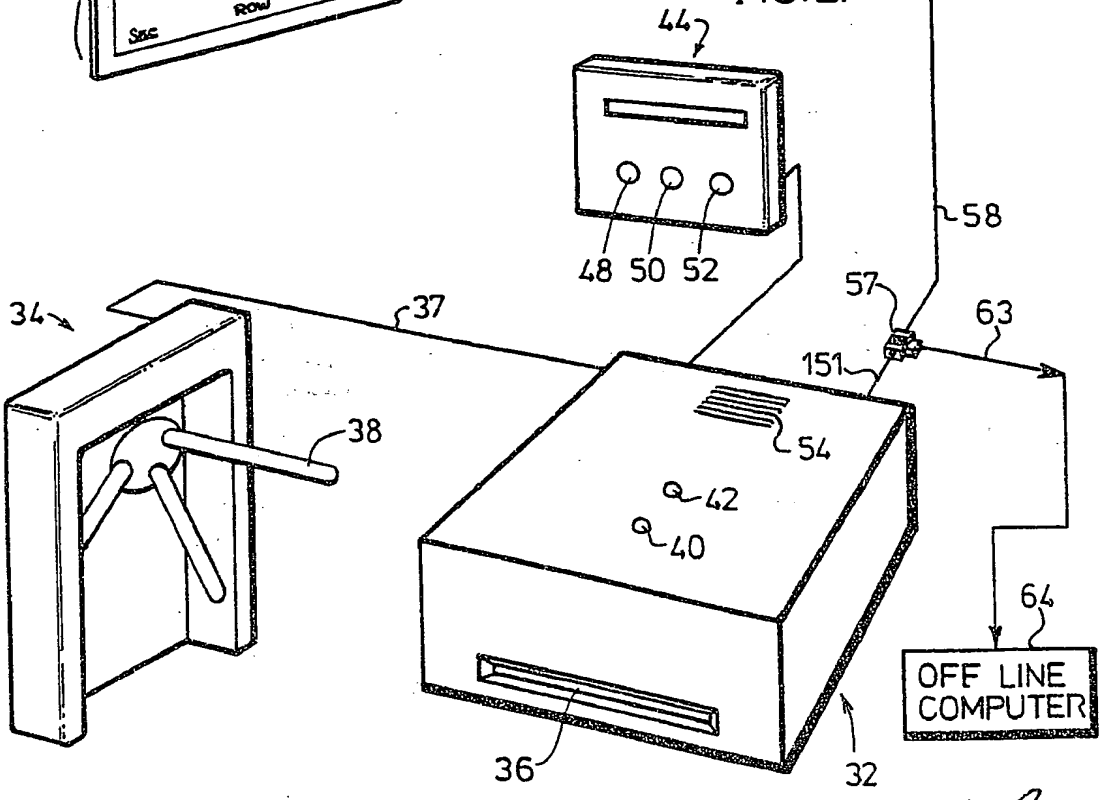


FIG. 2.



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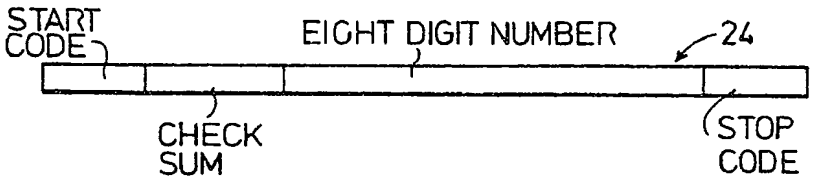

FIG. 3.

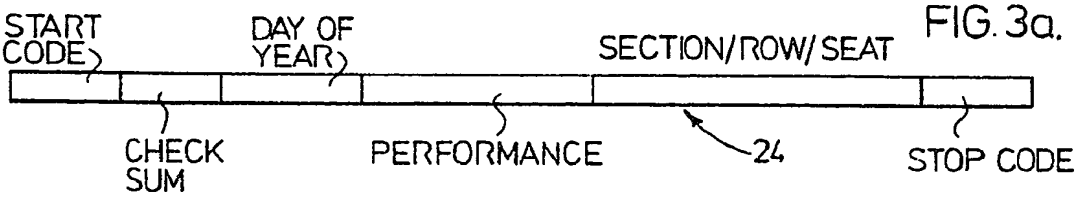

FIG. 3a.

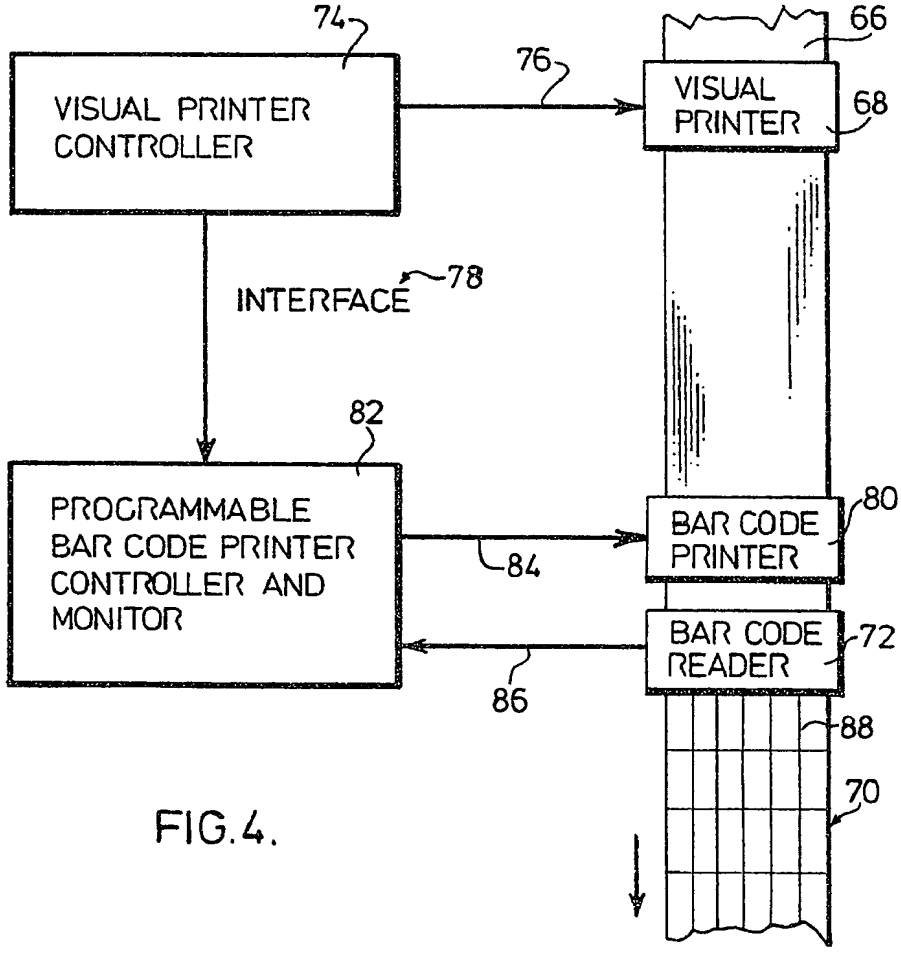

FIG. 4.

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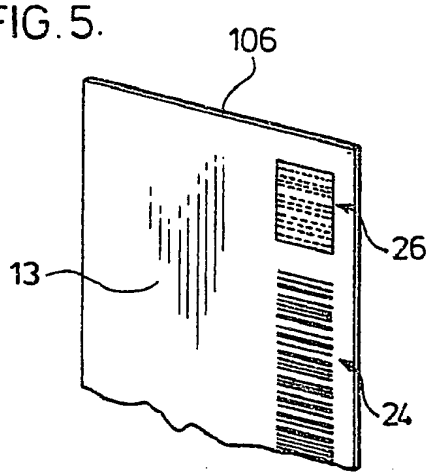
FIG. 5.



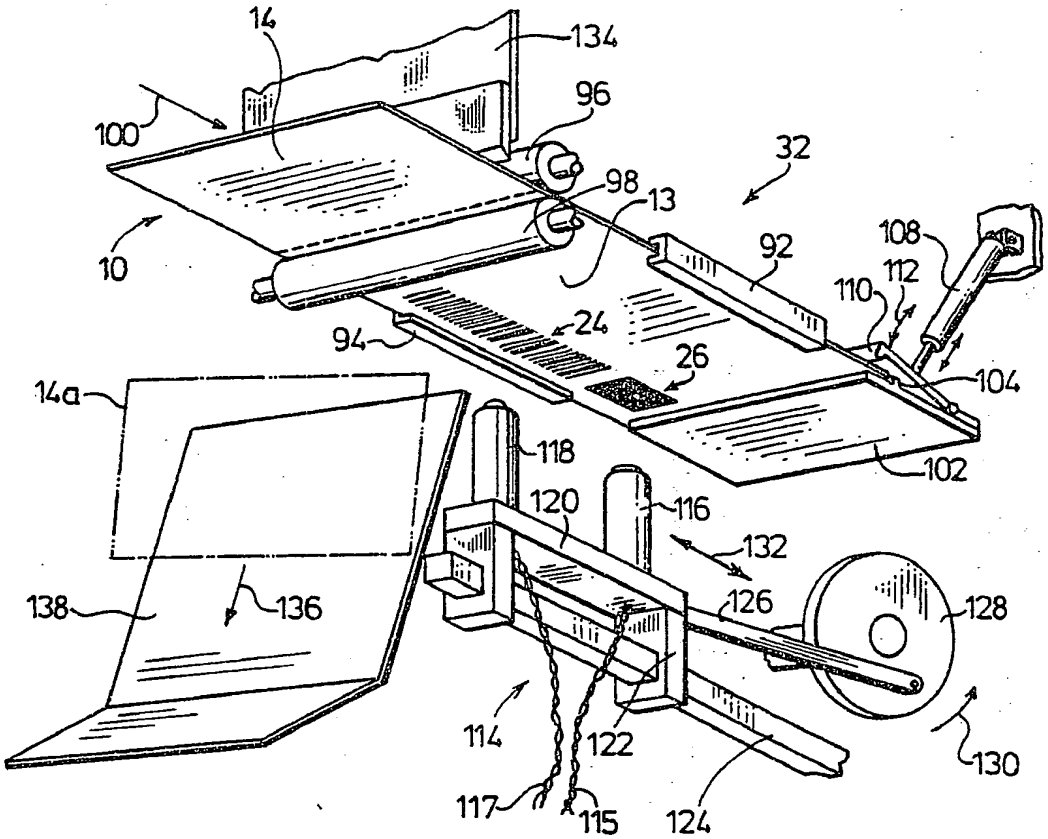


FIG. 6.

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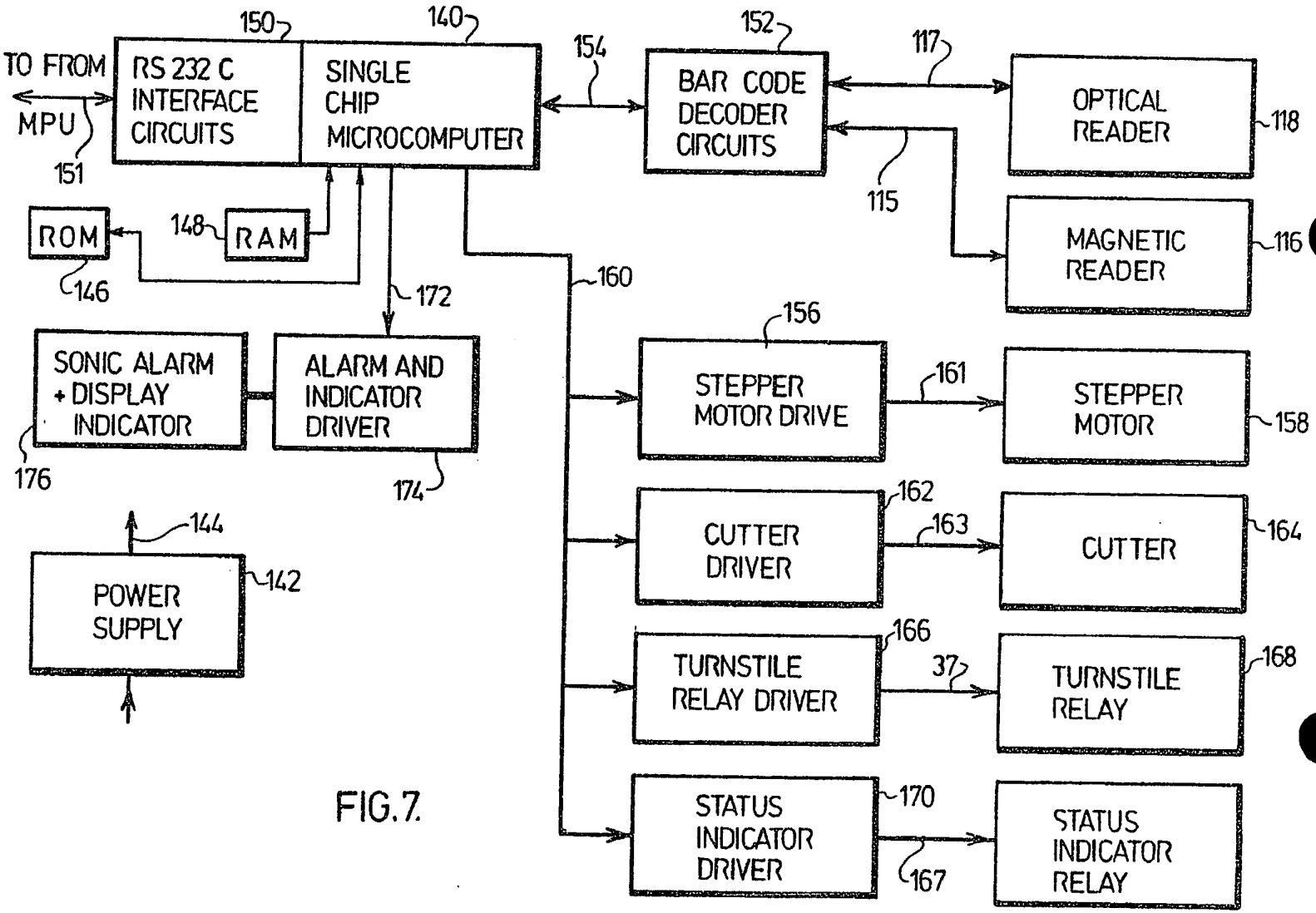

FIG.7.

FIG.8a.

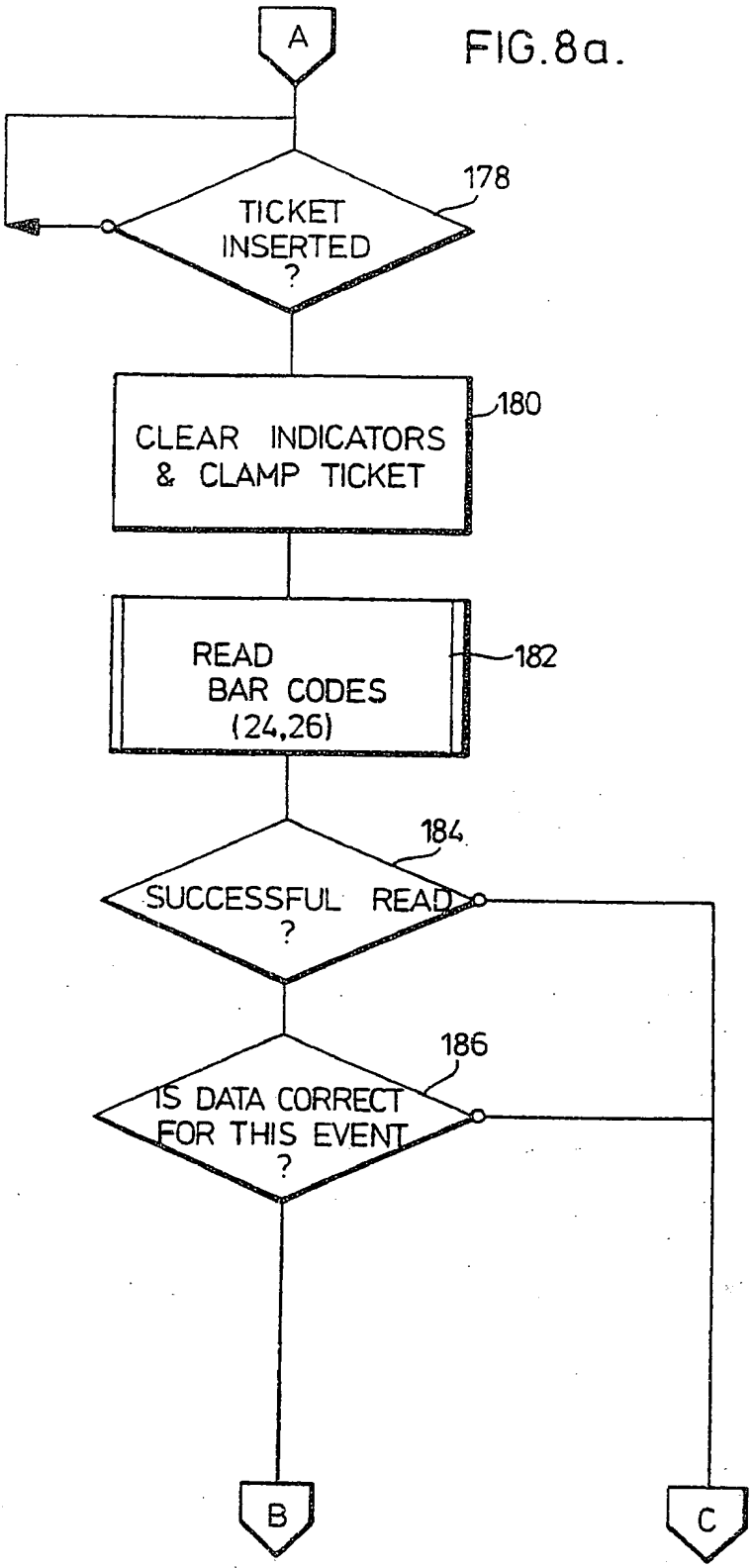

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FIG. 8b.